REMARKS

The above patent application claims priority to, and uses an English translation of the specification, claims and abstract of, Taiwanese patent application 89217870. While reviewing the English specification, Applicants' attorney noted that the grammar is somewhat awkward in certain paragraphs of the English specification. The awkward grammar, which apparently arose due to differences between Chinese and English, is modified in the enclosed substitute specification to conform better with normal English grammar. This includes modifying certain of the prepositions in the English specification.

A semiconductor die is commonly connected to a die pad with solder paste, typically tin solder paste or silver epoxy. Taking note of the fact that silver is used in epoxy but not (to a significant degree) in solder, the second paragraph of the Description of the Related Art has been corrected to provide that the die-attach material is tin solder paste or silver epoxy rather than specifying that solder paste is usually made of tin or silver. In the Description of the Related Art, "drift" has been changed to "drift or rotate" to more accurately reflect the original Chinese material. A similar change to include the words "or rotate" after the word "shift" has been made for the same reason in the Summary of the Invention.

In addition, the term "semiconductor" has been changed to "semiconductor device" at two points in the specification where the text clearly indicates that "semiconductor device" is meant. A parenthetical reference to one of the figures has been inserted into the specification at one point to clarify the disclosure.

Also, originally filed Claim 5 claims a leadframe having a plurality of die pads and a plurality of pins where each die pad has a plurality of slots which define a restrictive region where solder paste that connects the die to the die pad is restricted to the restrictive region. Consistent with Claim 5, a sentence has been added to the last paragraph of the specification to provide that the present leadframe can have a plurality of die pads, each having a restrictive region which is defined by such slots and where solder paste that connects a die to the die pad is restricted to the restrictive region. This conforms the specification to the original disclosure.

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None of the revisions presented in the substitute specification is believed to introduce any new matter. Consequently, the substitute specification should be entered.

The abstract has been revised to briefly describe the invention in clearer English grammar. Parenthetical reference symbols have been inserted in the Abstract.

Turning to the claims, Claims 1, 2, and 5 have been amended. Claims 3 and 4 have been canceled. Claims 6 - 22, of which Claims 7, 9, 11, 13, 17, and 19 are independent claims, have been added. Accordingly, Claims 1, 2, and 5 - 22 are now pending.

Claims 1 - 5 have been rejected under 36 USC 103(a) as obvious based on Yamaguchi, U.S. Patent 6,081,029, in view of Li et al. ("Li"), U.S. Patent 6,348,729 B1. This rejection is respectfully traversed in view of the revisions to the claims.

Yamaguchi discloses various packaged semiconductor devices in which a die pad that receives a die is provided with openings that penetrate the die pad outside where the die is located. Each of Figs. 7a and 9a of Yamaguchi presents an embodiment in which the openings in the die pad are generally circular. Each of Figs. 8 and 10 of Yamaguchi presents an embodiment in which the openings in the die pad are long ovals. Each of the openings in Figs. 7a and 8 has generally vertical sidewalls while each of the openings in Figs. 9a and 10 consists of a narrow upper portion and a wider lower portion.

Li discloses a technique for providing a semiconductor die (chip) with a suitable package. On page 2 of Office Action, the Examiner cites col. 5, lines 1 - 4, of Li as teaching the attachment of a die to its die pad with solder paste. However, the indicated portion of Li teaches that the leads of a packaged semiconductor device can be soldered to a printed-circuit board or other such substrate. As far as Applicants' attorney is aware, Li does not teach that a die can be soldered to a die pad.

In any event, independent Claim 1 has been amended to recite that four slots penetrate a die pad to define a restrictive region having four corners respectively corresponding to the slots and that each slot extends laterally around the corresponding corner substantially outside where the die pad receives a die. Independent Claim 5 has been amended in the same manner as Claim 1. Each slot in Claims 1 and 5 thus has a pair of legs respectively extending along the two lines that intersect to form the corresponding corner of the restrictive region.

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Claims 1 and 5 are now specifically directed to the embodiment of application Fig. 5 in which each of L-shaped slots 811 - 814 extends around the corresponding corner of restrictive region 815.

None of the openings in the die pad of any of the embodiments of Figs. 7a, 8, 9a, and 10 of Yamaguchi has a pair of legs configured to extend around any corner of a die-pad portion where the die is located. Hence, none of the embodiments of Figs. 7a, 8, 9a, and 10 of Yamaguchi meets the limitation of Claims 1 and 5 that each slot extend laterally around the corresponding corner. Nor does Yamaguchi elsewhere teach the limitation of Claims 1 and 5 that each slot extend laterally around the corresponding corner. Even if Li did teach soldering of a die to a die pad and even if it were reasonable to combine Yamaguchi and Li in the manner proposed by the Examiner, the combination of the two references would not teach the full subject matter of Claim 1 or 5. Accordingly, Claims 1 and 5 are each patentable over Yamaguchi and Li.

Claim 2 depends from Claim 1. New Claim 6 depends from Claim 5. Consequently, dependent Claims 2 and 6 are patentable over Yamaguchi and Li for the same reasons as Claims 1 and 5.

New independent Claim 7 recites a structure that contains a die, solder paste, and a die pad configured substantially the same as the die pads of Claims 1 and 5. New independent Claim 17 is directed to a method of connecting a die to a die pad configured substantially the same as the die pads of Claims 1 and 5. As a result, Claims 7 and 17 are patentable over Yamaguchi and Li for the same reasons as Claims 1 and 5.

New Claims 8 and 18 respectively depend from Claims 7 and 17 and are thus likewise patentable over Yamaguchi and Li on the same basis as Claims 1 and 5.

New independent Claims 9, 11, 13, and 19 are respective broadened versions of independent Claims 1, 5, 7, and 17. As with Claims 1, 5, 7, and 17, Claims 9, 11, 13, and 19 cover the embodiment of application Fig. 5.

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Each of Claims 9, 11, 13, and 19 recites a die location for receiving a die. Claims 9, 11, 13, and 19 each further recite that the die location laterally matches the die and has four corners. Although the die location is not explicitly shown in application Fig. 5, application Fig. 4 illustrates a die location on a die pad. As a result, the location of the die in Fig. 5 is clear.

Claims 9, 11, 13, and 19 provide that a plurality of slots penetrate each recited die pad to define a restrictive region, that solder paste for connecting the die to the die pad is substantially restricted to the restrictive region, and that one of the slots extends laterally around one of the corners of the die location substantially outside the die location. Similar to what was said above about Claims 1, 5, 7, and 17, Yamaguchi does not teach the limitation of any of Claims 9, 11, 13, and 19 that the indicated slot extend laterally around the corresponding recited corner. Claims 9, 11, 13, and 19 are thus patentable over Yamaguchi and Li for the same reasons as Claims 1 and 5.

Claim 10 depends from Claim 9. Claim 12 depends from Claim 11. Claims 14 - 16 depend (directly or indirectly) from Claim 13. Claims 20 - 22 depend (directly or indirectly) from Claim 19. Hence, Claims 10, 12, 14 - 16, and 20 - 22 are patentable over Yamaguchi and Li for the same reasons as Claims 9, 11, 13, and 19 and thus for the same reasons as Claims 1 and 5.

All of pending Claims 1, 2, and 5 - 22 are also patentable over Fugita, U.S. Patent 5,844,306, and Park et al. ("Park"), U.S. Patent 5,847,446, cited in the accompanying Information Disclosure Statement. Insofar as Park is concerned, each of openings 124 in Park's die pad extends below the location of the die attached to that die pad. Park does not meet or suggest the limitation of independent Claim 1, 5, 7, or 17 that each slot extend laterally around the corresponding corner substantially outside where the die pad receives the die. Nor does Park meet or suggest the limitation of independent Claim 9, 11, 13, or 19 that one of the slots extend laterally around one of the corners of the die location substantially outside the die location.

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In short, Claims 1, 2, and 5 - 22 are patentable over Yamaguchi and Li. These twenty claims are also patentable over the art cited in the accompanying Information Disclosure Statement. Consequently, Claims 1, 2, and 5 - 22 should be allowed so that the application may proceed to issue.

Please telephone Applicant's attorney at 408-453-9200, ext. 1371, if there are any questions.

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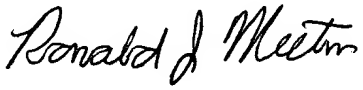
Respectfully submitted,



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APPENDIX

CLAIMS 1, 2, AND 5, WITH ANNOTATIONS TO INDICATE REVISIONS, OF U.S. PATENT APPLICATION 09/978,603, ATTORNEY DOCKET NO. AB-1170 US

1. (Amended) A die pad of a leadframe, [the die pad for receiving a die,] the die pad having four [comprising: a plurality of] slots that penetrate [penetrating] the die pad to define [and having] a restrictive region having four corners respectively corresponding to the slots such that each slot extends laterally around the corresponding corner substantially outside where the die pad receives a die and such that [defined by the slots, whereby a] solder paste for connecting the die to [with] the die pad is substantially restricted to [within] the restrictive region.

2. (Amended) A [The] die pad as [claimed] in Claim 1[,] wherein [the area of] the restrictive region and [is equal to the area of] the die are of approximately identical lateral areas.

5. (Amended) A leadframe comprising a plurality of die pads and a plurality of pins, [wherein the die pad is used for receiving a die, characterized in that] each die pad having four [comprises: a plurality of] slots which penetrate that [penetrating the] die pad to define [and having] a restrictive region having four corners respectively corresponding to the slots such that each slot extends laterally around the corresponding corner substantially outside where that die pad receives a die and such that [defined by the slots, whereby a] solder paste for connecting the die to that [with the] die pad is substantially restricted to [within] the restrictive region.